

# HKEX GOLD FUTURES INDICES

## METHODOLOGY

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## 1. Introduction

### 1.1 HKEX Gold Futures Indices

This Methodology contains the rules for calculating the HKEX Gold Futures Indices. This Methodology and all information contained herein is the exclusive property of Refinitiv Hong Kong Limited and its affiliates ("**Refinitiv**"). Refinitiv shall have no liability to any person or entity for the accuracy or completeness of the information contained herein.

HKEX Gold Futures Indices comprise excess return, total return and spot price indices based on gold futures contracts listed over Hong Kong Stock Exchange (HKEX) and traded in US dollar (USD) and Offshore Chinese Yuan (CNH).

## 2. Calculation Methodology

### 2.1 Commodity Excess Return Indices

The HKEX Gold Futures Excess Return Index,  $GD_t$ , is calculated at time  $t$  using front and immediate back expiry months for the gold futures contract as follows

$$GD_t = GD_{t-1} \times \frac{R_t}{R_{t-1}} \quad (1)$$

If time  $t$  falls outside the roll period,  $R_t$  is the price ( $FP_t$ ) of the front expiry month of the HKEX gold futures contract at time  $t$  i.e.  $R_t = FP_t$ . Similarly,  $R_{t-1}$  is the daily close price of the front expiry month at the market close on the day preceding time  $t$  (denoted  $t - 1$ ) i.e.  $R_{t-1} = FP_{t-1}$ .

The roll from the front expiry month to the immediate back expiry month of the relevant futures contract takes place over the five business day period prior to the last business day of each calendar month. Exposure is rolled in equal amounts of 20% on each day during the roll period such that by the fifth day of the roll period, 100% of the weight is in the immediate back expiry month.

If time  $t$  falls during a roll period,  $R_t$  is calculated as

$$R_t = \sum_{i=1}^2 DW_t^i \times FP_t^i \quad (2)$$

where the summation is over the front expiry month of the relevant futures contract ( $i = 1$ ) and the immediate back month ( $i = 2$ ).  $DW_t^i$  is the daily roll weight for expiry month ' $i$ ' on day of time  $t$  and  $FP_t^i$  is the futures price of expiry month ' $i$ ' at time  $t$ .

Once the five day roll period is complete, the immediate back month during the roll becomes the new front expiry month and  $R_t$  and  $R_{t-1}$  are calculated using the new front expiry month only until the next roll.

The HKEX Gold Futures Excess Return Index is available in both USD and CNH.

## 2.2 Commodity Total Return Indices

The HKEX Gold Futures Total Return Index,  $GDTR_t$ , replicates the total return of a portfolio of HKEX Gold futures and a cash investment. It is calculated using the futures daily returns plus the daily interest from the cash investment as follows

$$GDTR_t = GDTR_{t-1} \times \left( \frac{R_t}{R_{t-1}} + TBR_t \right) \times (1 + TBR_t)^{d-1} \quad (3)$$

where  $d$  is the number of calendar days between the current and previous business days, and  $TBR_t$  is the daily interest from the cash investment calculated as

$$TBR_t = \left( \frac{1}{1 - \frac{91}{360} \times TB_{t-1}^{3mo}} \right)^{\frac{1}{91}} - 1 \quad (4)$$

The HKEX Gold Futures Total Return Index,  $GDTR_t$ , is calculated in both USD and CNH. For the USD denominated HKEX Gold Futures total return index,  $TB_{t-1}^{3mo}$  is the 3 month US Treasury Bill high rate for the previous day. For the CNH denominated HKEX Gold Futures Total Return Index,  $TB_{t-1}^{3mo}$  is the 3 month offshore Chinese Yuan Hibor interest rate, which is published by Treasury Markets Association at 11:15 a.m. every Hong Kong business day, for the previous business day.

## 2.3 Commodity Spot Price Indices

The HKEX Gold Futures Spot Price Index,  $GDS_t$ , is calculated using the nearest HKEX Gold futures expiries as follows

$$GDS_t = 1000 \times \frac{GP_t}{GB} \quad (5)$$

where  $GP_n$  is the current futures expiries traded prices at time  $t$  and  $GB$  is the consecutive futures expiries close prices as of 10 July 2017. Rotation from current calendar month future expiry to next calendar month future expiry takes place after close of 4<sup>th</sup> business day of each calendar month.

The HKEX Gold Futures Spot Price Index is calculated in USD and CNH.

### 3. Futures Expiries

#### 3.1 Front Expiry Month by Calculation Month for Excess and Total Return Indices

The calendar below shows the relevant futures contract expiry months used during each calculation month prior to the roll over period.

Calculation Month	Front Expiry Month	
	Gold USD	Gold CNH
Jan	Feb	Jun
Feb	Apr	Jun
Mar	Apr	Jun
Apr	Jun	Jun
May	Jun	Jun
Jun	Aug	Dec
Jul	Aug	Dec
Aug	Dec	Dec
Sep	Dec	Dec
Oct	Dec	Dec
Nov	Dec	Dec
Dec	Feb	Jun

#### 3.2 Front Expiry Months by Calculation Month for Spot Price Index

Calculation Month	Expiry Month
Jan	Jan → Feb
Feb	Feb → Mar
Mar	Mar → Apr
Apr	Apr → May
May	May → Jun
Jun	Jun → Jul
Jul	Jul → Aug
Aug	Aug → Sep
Sep	Sep → Oct
Oct	Oct → Nov
Nov	Nov → Dec
Dec	Dec → Jan

## 4. Data Sources and Index Publication

### 4.1 Data Source

All commodity prices used in the HKEX Gold Futures Indices are taken from the HKEX Gold futures contract prices published by the Hong Kong Stock Exchange (HKEX). On each business day, the last traded price in the HKEX Gold futures contract prior to (and including) 16:30 HKT (08:30 GMT) will be used to determine the closing value for the HKEX Gold Futures Indices for that business day. (The daily settlement prices for the HKEX Gold futures contract will not be used to determine the daily closing value for the HKEX Gold Futures Indices). HKEX is a SFC (Securities and Futures Commission of Hong Kong) regulated Hong Kong market place and a well established platform for commodity futures price discovery.

### 4.2 Index Dissemination

The HKEX Gold Futures Indices are disseminated in real time on which HKEX is open for business on below time windows

Trade Date	Start Time			End Time		
	Actual Day	HKT	GMT	Actual Day	HKT	GMT
Monday	Monday	08:30	00:30	Monday	16:30	08:30
Tuesday	Monday	17:15	09:15	Tuesday	16:30	08:30
Wednesday	Tuesday	17:15	09:15	Wednesday	16:30	08:30
Thursday	Wednesday	17:15	09:15	Thursday	16:30	08:30
Friday	Thursday	17:15	09:15	Friday	16:30	08:30
Friday extended ticks	Friday	17:15	09:15	Saturday	03:00	19:00 Friday

(Weekend trading is excluded from the index history and real-time calculation.)

### 4.3 Index Publication

The HKEX Gold Futures Indices are published on Refinitiv Eikon with the following RICs:

HKEX USD Gold Futures - Excess Return Index:	.HKGDUER
HKEX USD Gold Futures - Total Return Index:	.HKGDUTR
HKEX USD Gold Futures - Spot Price Index:	.HKGDUSP
HKEX CNH Gold Futures - Excess Return Index:	.HKGDRER
HKEX CNH Gold Futures - Total Return Index:	.HKGDRTR
HKEX CNH Gold Futures - Spot Price Index:	.HKGDRSP

## **5. Quality Control**

### **5.1 Quality Control**

Refinitiv has quality control procedures in place to monitor any prices, whether they are obtained from a regulated exchange or other market, prior to calculation of indices as well as prior to publication. The Refinitiv Indices Operations document describes the quality control procedures in further detail.

### **5.2 Error Reporting**

The Index Manager may determine that a retrospective recalculation is required and if so will then determine the indices that are to be amended for that calculation.

A retrospective recalculation will only be made when there has been a manifest and material error. The Index Manager may only determine that a retrospective calculation is required following feedback from the Index Action Committee on the proposed retrospective recalculation. The Index Manager may also seek feedback from the Index Advisory Group and/or stakeholders on proposed changes.

Any retrospective recalculation will be notified to users via the alert system on Refinitiv Eikon.

### **5.3 Insufficient Data and Market Disruptions**

Refinitiv endeavours to develop and publish indices only where Refinitiv has a high level of confidence of long-term availability and access to the necessary data to administer the indices.

A “Market Emergency” is herein defined as any unscheduled and extraordinary condition in which market liquidity is interrupted (such as an event resulting in the unscheduled closing of Hong Kong Futures exchange). Should a Market Emergency occur, the HKEX Gold Futures Indices Index Manager reserves the right to take such action with respect to the HKEX Gold Futures Indices, as it deems appropriate given the circumstances and after consulting with the Index Advisory Group and the Index Action Committee where appropriate (see section 5).

The HKEX Gold Futures Indices Index Manager will attempt to notify interested parties of any such actions as well in advance as is practicable. There is no assurance, however, that following a Market Emergency, the actions taken in response to such Market Emergency, or any other force



majeure event, will not have an adverse effect on the value of the HKEX Gold Futures Indices or the manner in which they are calculated.

A Rollover Disruption Event is defined as any day on which a commodity is scheduled to roll, in which either: a) the front month or back month contracts for the commodity close at the daily maximum or minimum price as determined by the rules for the relevant exchange, or b) the exchange fails to publish a close price for the commodity, or c) the exchange on which the commodity trades is not scheduled to be open. If a Rollover Disruption Event occurs for the HKEX Gold futures contract, that portion of the rollover which was scheduled to occur on that day will be deferred until the next business day upon which no Rollover Disruption Event occurs for that commodity.

If, on any date the HKEX Gold Futures Indices are scheduled to open, a close price for gold futures (defined in section 3.1 and 3.2 as front expiry months by calendar month) in the HKEX Gold Futures Indices are unavailable, then the price used in the HKEX Gold Futures Indices for gold futures will be the close price on the previous business day upon which a price is available.

#### **5.4 Cessation Of An Index**

Refinitiv aims not to stop the publication of any index that is used as a benchmark.

For those cases where Refinitiv does decide to stop the publication of an index, Refinitiv will look to finding a suitable successor to its role as Administrator of the index. Should no successor be found, Refinitiv will conduct a consultation with any relevant Index Advisory Group, the Index Action Committee, the Refinitiv Independent Oversight Committee and all other known stakeholders. Refinitiv will publish a notice on its website about the possibility of stopping the publication of an index and inviting anyone to provide feedback.

Such notice will be posted at least 6 months where possible prior to cessation of publication of the index, or on a best efforts basis for circumstances beyond the control of Refinitiv. After the consultation period, Refinitiv will publish externally the timeline for cessation. Internally, detailed operating procedures will be drafted to ensure a managed cessation.

## 6. HKEX Gold Futures Indices Governance

### 6.1 Overview

HKEX Gold Futures Indices are administered by Refinitiv Hong Kong Limited which makes all decisions regarding index calculations and changes to the Index Methodology.

HKEX Gold Futures Indices are subject to the Refinitiv governance policy for all index methodologies:

- The Refinitiv Benchmark Governance Framework sets the policies governing each aspect of the index business, including oversight, conflicts of interest, materials retention and remuneration.
- The Refinitiv Index Methodology Policy describes the requirements that HKEX Gold Futures Index methodologies need to satisfy.

The governance of the HKEX Gold Futures Indices follows the governance framework described in the relevant documents except where this Methodology provides for specific exceptions.

### 6.2 Index Team

The Index Team is responsible for the maintenance, calculation and distribution of the HKEX Gold Futures Indices as set out in this Methodology.

### 6.3 Index Manager

The Index Manager is responsible for the integrity and quality of the Index and has specific responsibilities as follows:

- To interpret the Index Methodology
- To review feedback received from the Index stakeholders
- Develop and implement changes to the Index Methodology if desired by feedback from the IAC, the Index Advisory Group (IAG) (see below), other stakeholders, or by market events
- Manage interaction with stakeholders, the Index Action Committee and the IAG in respect of rebalances and Index Methodology changes

Following interaction with the Index Action Committee and, where required, the IAG or stakeholders, the Index Manager is responsible for determining any changes to the Methodology.

#### **6.4 Index Action Committee**

The Index Action Committee (“IAC”) is an internal Refinitiv group of subject matter experts (indices as well as asset classes) that support the Index Manager with additional advice related to Methodology interpretation or changes to the Methodology. Specifically, the Index Manager may communicate the feedback obtained from Index stakeholders to solicit advice from the IAC.

#### **6.5 Stakeholder Consultation**

An Index Advisory Group (IAG) of market participants provides advice and expertise on proposed Methodology changes and responses to market events on a bilateral basis. The Index Manager may consult the IAG at its discretion and retains all responsibility for deciding any issues under review. The Index Manager may seek the views from the wider market when considering an issue.

Issues on which the Index Manager would typically consult the IAG include changes to the index calculation methodology and exceptional market events.

The IAG shall include a representative from the Hong Kong Stock Exchange (HKEX), who is involved with the calculation or maintenance of the HKEX Gold Futures Indices. Other members of the IAG shall be at the invitation of Refinitiv.

#### **6.6 Methodology Review**

The HKEX Gold Futures Indices Methodology is reviewed once per year and, if required by market events, more frequently.

Any changes to the Methodology are approved by the Index Manager in consultation with the Index Advisory Group and the Index Action Committee as appropriate and will be announced by Refinitiv. All reasonable efforts will be made to provide at least one month’s notice of any such changes prior to their implementation.